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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,768	09/11/2006	Ivan Greager	10690/013	1298

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EXAMINER
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MCCAIG, BRIAN A

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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08/14/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/549,768	<b>Applicant(s)</b> GREAGER ET AL.	
	<b>Examiner</b> BRIAN MCCAIG	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 46-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 46-72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This Office action is based on the the arguments filed April 17, 2009, in response to the initial Office action for the 10/549768 application filed September 11, 2006.
2. Amendment to claim 51 is noted and the objection is hereby withdrawn.
3. The amendment to the specification is also noted and the objection to the drawings is hereby withdrawn also.
4. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 119(e) and 120 as follows: Currently, there is no statement in either the specification or an application data sheet claiming priority to the non-provisional applications disclosed in the oath/declaration. Appropriate action is required.
5. New grounds of rejection follow necessitated by applicants' arguments follow.

### ***Response to Amendment***

### ***Claim Rejections - 35 USC 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 46, 48-57, and 71 are rejected under 35 U.S.C. 103(a) as obvious over O'REAR ET AL (WO 01/64610 A1), hereafter referred to as O'REAR.**

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8. With respect to claims 46 and 50, O'REAR discloses a process for producing linear alkyl benzene, the process including the steps of obtaining a hydrocarbon condensate containing olefins, paraffins and oxygenates from a low temperature Fischer-Tropsch (F-T) reaction using a cobalt catalyst [page 2, lines 11-13; page 4, lines 15-23; page 8, line 9] and

- a. fractionating a desired carbon number distribution from the hydrocarbon condensate to form a fractionated hydrocarbon condensate stream which is the product of a Fischer-Tropsch reaction [page 13, line 22 to page 14, line 5];
- b. extracting oxygenates from the fractionated hydrocarbon condensate stream from step (a) to form a stream containing olefins and paraffins which is the product of a Fischer-Tropsch reaction [page 2, lines 14-16];
- c. combining the stream containing olefins and paraffins from step (b), which is the product of a Fischer-Tropsch reaction, with the feed stream from step (g) to form a combined stream [page 33, lines 10-11];
- d. alkylating olefins in the combined stream from step (c) with benzene in the presence of a suitable alkylation catalyst in an alkylation reactor [page 29, line 30 to page 33, line 31];
- e. recovering linear alkyl benzene from the alkylation reactor [page 33, line 26];
- f. recovering unreacted paraffins from the alkylation reactor [page 33, lines 10-11];

- g. dehydrogenating the unreacted paraffins in the presence of a suitable dehydrogenation catalyst to form a feed stream containing olefins and paraffins [page 30, lines 14-15]; and
  - h. sending the feed stream containing olefins and paraffins from step (g) to step (c) [page 33, lines 10-11].
9. While O'REAR discloses the dehydrogenation reaction of the paraffins in the feedstock (with recycle of unreacted paraffins from the downstream alkylation thereto) prior to the alkylation reaction instead of after the alkylation reaction in a recycle stream, the applicant is reminded that selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) and MPEP 2144.04.
10. Furthermore, since O'REAR discloses that the F-T reaction is carried in a slurry bed reactor at a temperature of 160-280° C (and, more particularly, 210-260° C) and in the presence of a cobalt catalyst to provide a hydrocarbon condensate [page 11, lines 7-12], which is substantially the same as the process to obtain the F-T condensate in the instant application, it would have been obvious to one of ordinary skill in the art to dehydrogenate the paraffins in the feedstock either prior to alkylation or after alkylation in a recycle stream in order to increase the product yield.
11. With respect to claims 48-49 and 51, O'REAR does not appear to explicitly disclose that the hydrocarbon condensate contains 60 to 80% by weight paraffins and 10 to 30% by weight olefins, and, more particularly, less than 25% by weight. However, it is expected that such a requirement is inherent in the invention of O'REAR since the

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feed, the reaction conditions [page 11, lines 7-19], reaction vessel (slurry reactor), and catalyst (cobalt on an alumina support) are similar to those disclosed in the instant application.

12. Alternatively, it would have been obvious to one of ordinary skill in the art to modify any of the aforementioned variables to obtain a hydrocarbon condensate containing 60 to 80% by weight paraffins and 10 to 30% by weight olefins, and, more particularly, less than 25% by weight olefins, because the feed, reaction conditions, reaction vessel, and catalyst of O'REAR are similar to those disclosed in the instant application, and it has been held that the provision of adjustability of variables or parameters, where needed, involves routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

13. With respect to claims 52-54, O'REAR does not appear to explicitly disclose that the olefins in the hydrocarbon condensate have the required linearity. However, it is expected that such a requirement is inherent in the invention of O'REAR since the feed, the reaction conditions, reaction vessel, and catalyst are similar to those disclosed in the instant application.

14. Alternatively, since the reaction conditions, reaction vessel, and catalyst of O'REAR are similar to those disclosed in the instant application, it would have been obvious to one of ordinary skill in the art to modify any of the aforementioned variables to obtain a hydrocarbon condensate with the required linearity, since it has been held that the provision of adjustability of variables or parameters, where needed, involves routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

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15. With respect to claims 55-57, O'REAR discloses that the hydrocarbon condensate is fractionated in step a) into the C<sub>9</sub>-C<sub>26</sub> range [page 15, paragraph 1 & page 30, paragraph 1]. O'REAR does not appear to explicitly disclose that the fractionated hydrocarbon product contains 10 to 30% by weight olefins with a degree of linearity greater than 92%. However, as previously discussed, it is expected that such a requirement is inherent in the invention of O'REAR since the feed, reaction conditions, reaction vessel, and catalyst are similar to those disclosed in the instant application.

16. Alternatively, since the feed, reaction conditions, reaction vessel, and catalyst of O'REAR are similar to those disclosed in the instant application, it would have been obvious to one of ordinary skill in the art to modify any of the aforementioned variables to obtain a hydrocarbon condensate with the required linearity and olefin concentration, since it has been held that the provision of adjustability of variables or parameters, where needed, involves routine skill in the art. *In re Stevens*, 101 USPQ 284 (CCPA 1954).

17. With respect to claim 71, O'REAR does not appear to explicitly disclose that the dehydrogenation reaction is carried out at a conversion rate of 10 to 15%. However, it would have been obvious to one of ordinary skill in the art to specify a conversion rate of dehydrogenation. It is expected that the conversion in O'REAR will also be in the range claimed since the reaction conditions, reaction vessel, and catalyst are similar to those disclosed in the instant application [page 31, paragraph 2 to page 32, paragraph 1].

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18. **Claims 47, 58-70, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over O'REAR ET AL (WO 01/64610 A1) as applied to claims 46, 48-57, and 71 above and in further view of BECKER (DE 19911910 A1) and DE WET ET AL (WO 02/31085 A2), hereafter referred to as O'REAR, BECKER, and DE WET, respectively.**

19. Since BECKER is equivalent to the Republic of South Africa application No. 2000129, which is in the English translation, the Examiner will reference that application as the disclosure of the DE 19911910 A1 patent.

20. With respect to claims 47, 58-61, and 64-70, O'REAR discloses that the hydrocarbon condensate is treated by extraction to remove oxygenates and other by-products of a F-T synthesis. O'REAR does not appear to explicitly disclose that a light solvent comprising methanol and water is used in the extraction; that the water concentration is more than 3% by weight, more particularly between 5 and 15% by weight; the concentration of olefins and paraffins and oxygenates in the feed and exit streams to a stripper column, recovery rates of olefins and paraffins, or that the olefin/paraffin ratio is preserved in the extraction.

21. However, BECKER, which is concerned with a process for separating oxygenates from a hydrocarbon flow, discloses a liquid/liquid extraction process using a light solvent comprised of methanol and water [page 1, paragraph 1 & page 2, paragraph 5]. BECKER does not appear to explicitly disclose that the water concentration in the light solvent is more than 3% by weight, and more particularly between 5 and 15% by weight.



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22. However, DE WET, which is concerned with the separation of oxygenates from hydrocarbons, discloses an extraction system using a light polar solvent, although not specifically methanol, comprising water in a concentration less than 19%.

23. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have modified the process of BECKER with the solvent content of DE WET because such an amount is effective in the extracting process. Furthermore, it would have been obvious to one of ordinary skill in the art to modify the process of DE WET with the solvent components of BECKER including methanol because the solvents are inert relative to the oxygenates, thermally stable, have a sufficiently low freezing point, and have negligible affect on utility of the product as explained by BECKER [page 2, paragraph 7]. Additionally, at the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the process of O'REAR with the extraction process of modified BECKER because the process is simple and removes oxygenates from the largest possible spectrum of hydrocarbons as disclosed by BECKER [page 2, paragraph 3]. Alternatively, it would have been obvious to one of ordinary skill in the art to modify the process of O'REAR with the extraction process of modified DE WET since O'REAR discloses the necessity of separating oxygenates from a hydrocarbon condensate [page 2, lines 14-16] and DE WET is an obvious choice since the hydrocarbons fractions being separated are similar to that of O'REAR [page 5, paragraph 5 of DE WET] and the hydrocarbons and oxygenates are formed under similar F-T conditions [page 1, paragraph 2 of DE WET].

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24. None of the prior art references appear to explicitly disclose the concentration of olefins/paraffins and oxygenates in the feed and exit streams to a stripper column, recovery rates of olefins and paraffins, or the preservation of the olefin/paraffin ratio in the extraction process. However, it is expected that the process of modified O'REAR has the required limitations since the F-T feedstock and extraction process is similar to that disclosed in the instant application. That is, since the extraction process of modified BECKER is essentially the same as the claimed process (similar solvents, similar F-T hydrocarbon fractions, and similar solvent to feed ratios) , it is expected that the concentration of olefins/paraffins and oxygenates in the feed and exit streams to a stripper column, the recovery rates of olefins and paraffins, and the olefin/paraffin ratio will meet the limitations recited in the instant application.

25. With respect to claims 62 and 63, reference is made to the preceding discussion of modified O'REAR. In addition, DE WET discloses that the tops product from a solvent recovery column comprising a polar solvent (in this case, the methanol/water combination of modified DE WET) and olefins/paraffins is recycled back to the extraction column [reference element 40, figure 1; page 8, paragraph 1].

26. Similarly, BECKER discloses that the tops product (gas flow) from a solvent regeneration column [reference element 9, figure 3] comprising a polar solvent and olefins/paraffins is recycled back to the extraction column [via reference elements 2, 12, 14, and 16 in figure 3; page 6, paragraph 3 to page 7, paragraph 1]. Furthermore, since the gas flow [reference element 12, figure 3] contains solvent and hydrocarbons, which is recycled to the extraction column, it is also analogous to the bottoms product of

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the solvent recovery column in the instant application. While there may be a slight difference in the operating conditions of the solvent recovery column between BECKER and the instant application, the applicant is reminded that if the prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. *In re King*, 231 USPQ 136. In this case, the claim requires recycling a distillation bottoms product comprising water, oxygenate, and olefins/paraffins of which most of the olefins/paraffins and oxygenates are subsequently decanted leaving water (solvent) to be recycled. BECKER discloses a gas flow comprising solvent gas comprising water and hydrocarbons (olefins/paraffins), which are subsequently decanted leaving the solvent gas comprising water to be recycled.

### ***Response to Arguments***

27. Applicant's arguments with respect to claims 46 and 50 have been considered but are moot in view of the new ground(s) of rejection. However, additional comments to the arguments follow.

28. The applicant has argued that the reactants to the alkylation process step are from a dehydrogenation reaction and not from a F-T reaction.

29. The applicants' arguments are not persuasive because O'Rear discloses a F-T product prepared in substantially the same process as described above (see, e.g.,

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paragraph 10) as the F-T product in the instant application which contains olefins.

Support for this assertion is provided by O'Rear on page 2, lines 25-26, that the concentration of olefins is dependent upon the particular F-T conditions. Since the reaction conditions disclosed by O'Rear are substantially similar to those in the instant application, it is expected that the olefin concentrations in the product are similar.

Consequently, the olefins in the feedstock are present from a F-T reaction as are the paraffins and oxygenates. The hydrogenation reaction taught by O'Rear only converts a portion of the paraffins to olefins in order to prepare the alkylbenzenes. However, the olefins and remaining paraffins are from a F-T reaction despite the assertion of the applicant to the contrary.

30. The applicant has argued that O'Rear does not teach the extraction of oxygenates and the combination of dehydrogenating the paraffins to form olefins and combining the olefins and unreacted paraffins with the olefins and paraffins from the extraction process.

31. The applicants' arguments are not persuasive because O'Rear teaches recycling the feed stream obtained from a dehydrogenation of the unreacted paraffins, and it would have been obvious to one of ordinary skill in the art to combine the olefins and remaining unreacted paraffins with the F-T feed containing the same prior to the alkylation step and after the oxygenate removal step, since O'Rear teaches that the oxygenate removal step takes place preferably after the F-T feed is separated into C<sub>6</sub>-C<sub>8</sub> and C<sub>18</sub>-C<sub>26</sub> fractions [page 2, lines 1-4], which corresponds to step a) in claim 46 of the instant application, and it would not have been necessary to remove oxygenates

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from the recycle stream. Regardless, the applicant is reminded that selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) and MPEP 2144.04.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN MCCAIG whose telephone number is (571) 270-5548. The examiner can normally be reached on M-F 8-430.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BAM

/ROBERT J. HILL, JR/

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Primary Examiner, Art Unit 1797